New Approaches for Acquisition Reform

Systems Engineering

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Engineering Management

- Recent Direction
  - Interim Regulation DoD 5000.2-R, Jan 2001
- Systems Engineering in the revised Acquisition Process
- Managing in the Acquisition Reform Environment

Interim Regulation
5000.2-R January 2001

Design Considerations

- Acquisition Strategy
- Systems Engineering

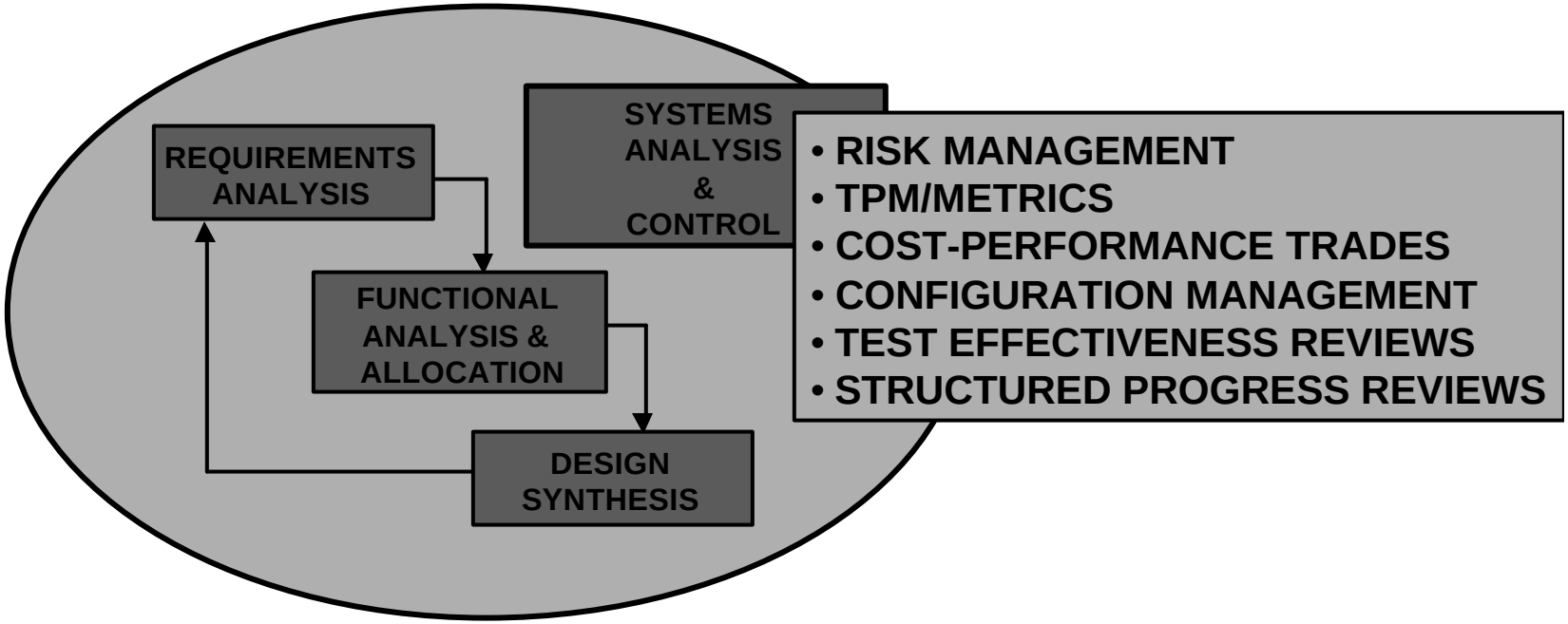
Acquisition Strategy
Areas of Emphasis - Technical

- Risk
- Integrated Digital Environment
- Software Intensive Programs
- Open Systems
- Interoperability
- Program Protection
- Survivability
- Demilitirization and Disposal

Systems Engineering
Design Considerations

- The Systems Engineering Process
  - Transform needs and requirements into design solutions
  - Ensure interoperability and integration of all interfaces
  - Characterize and manage technical risk
  - Identify vulnerabilities and minimize information assurance and force protection risks

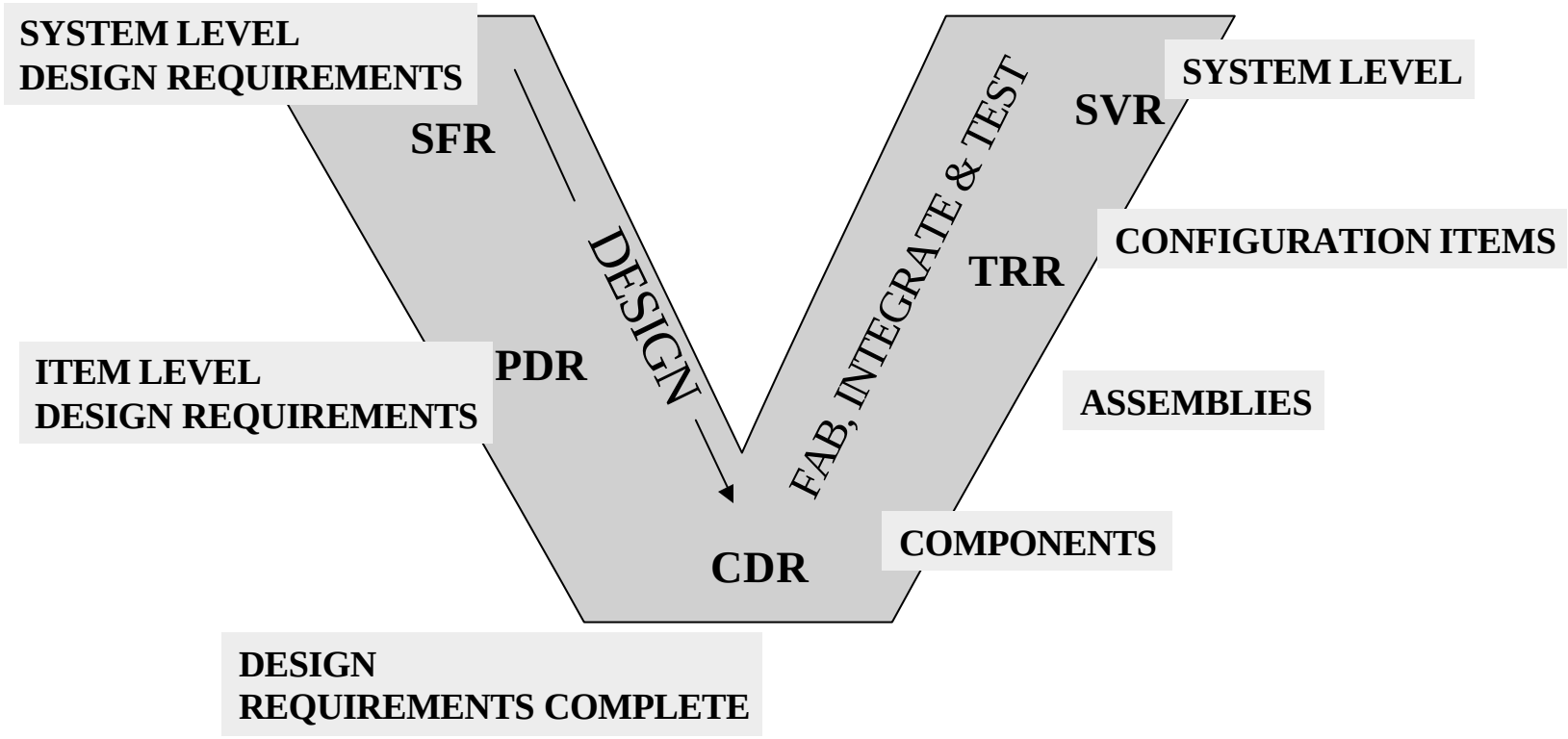
The Systems Engineering Process



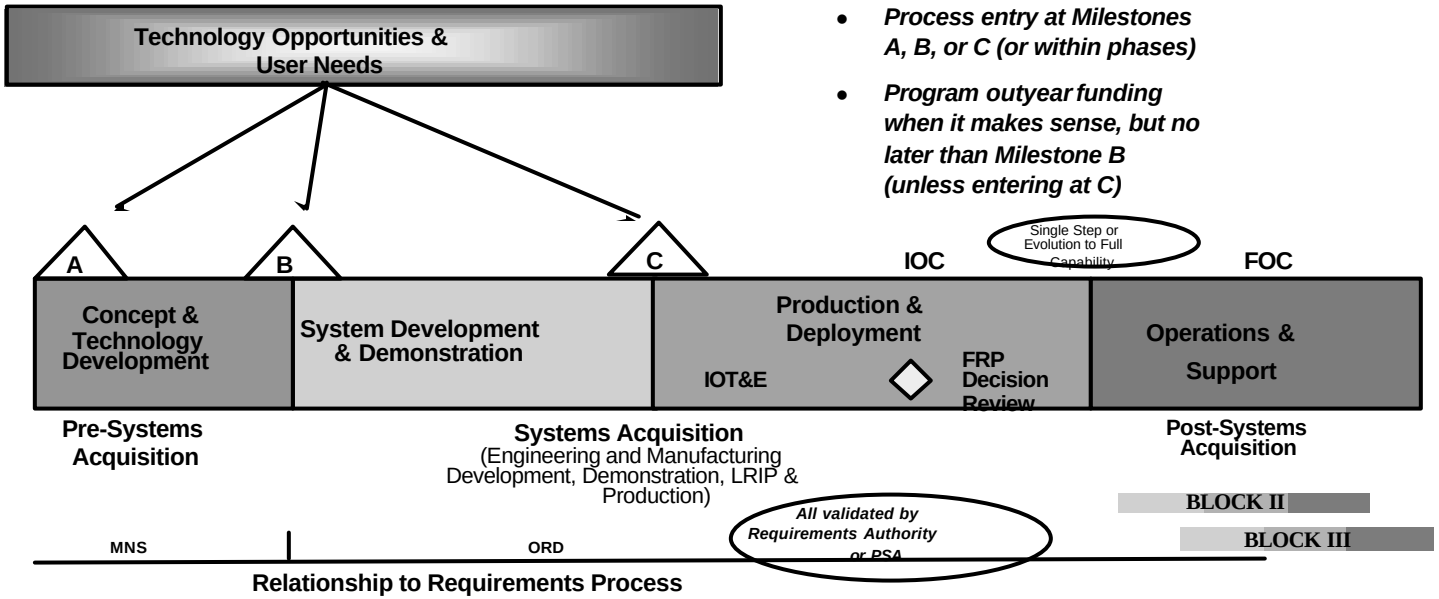
Design Considerations
Areas of Emphasis

- Producibility and Manufacturing
- Modeling and Simulation
- Supportability and Reliability
- Open Systems Designs
- Software Development
- Human Factors
- Hazardous Materials
- Interoperability
- Survivability

System Development ‘V’

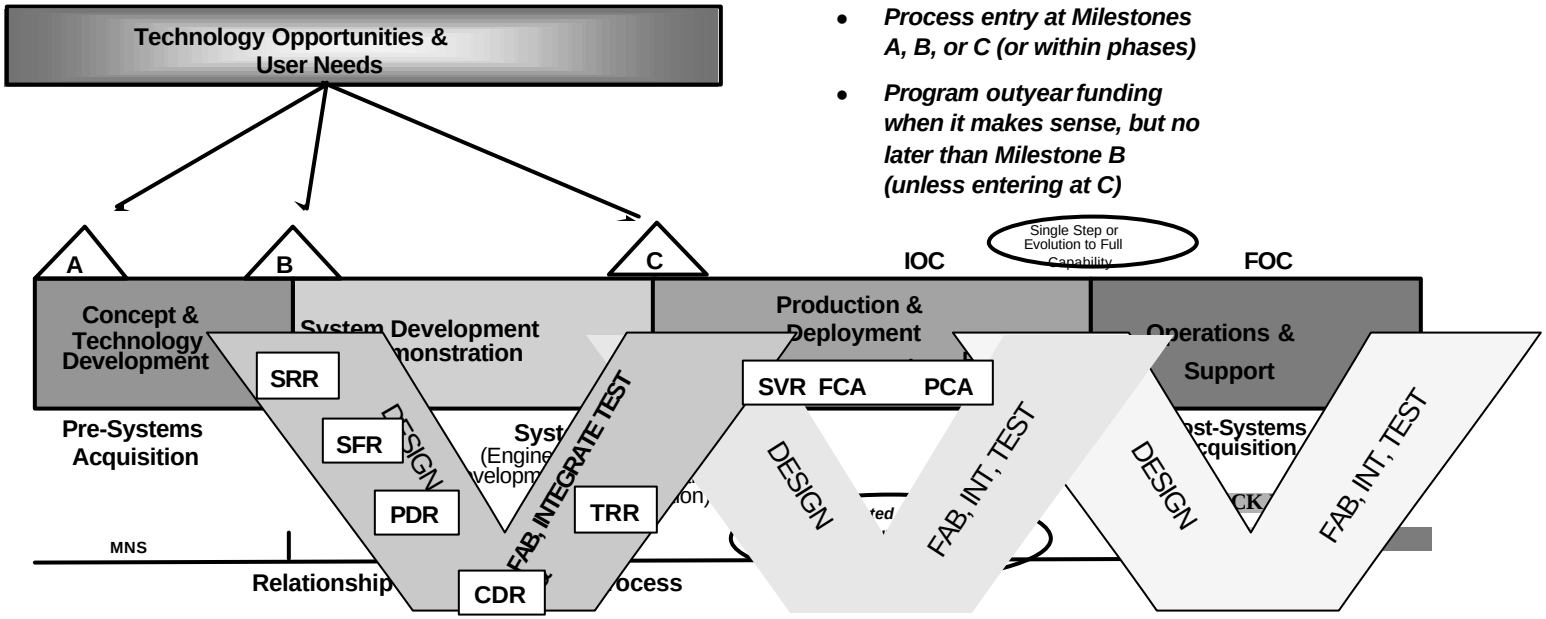


THE 5000 MODEL



- ***Process entry at Milestones A, B, or C (or within phases)***
- ***Program outyear funding when it makes sense, but no later than Milestone B (unless entering at C)***

THE 5000 MODEL



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Managing in the Reform Environment

Recent NASA experience and reports should serve as notice to all concerned with managing technically sophisticated projects in an acquisition reform environment

From Lewis Spacecraft Mission Failure Investigation Board Report

- **"Especially in *'Faster, Better, Cheaper'* projects, communication [between senior NASA and contractor management] is essential…"**
- **"Requirements changes without adequate resource adjustments"**
- **"Inadequate engineering discipline"**
- **"The Government and the contractor must be clear on the mutual roles and responsibilities of all parties, including the level of reviews and what is required of each side and each participant in the Integrated Product Development Team."**
- **"*'Faster, Better, Cheaper'* methods are inherently more risk prone and must have their risks actively managed"**

From the Mars Climate Orbiter Mishap Investigation Board Phase I Report

- **“Lack of identification of acceptable risk by the operations team in the context of the “Faster, Better, Cheaper” philosophy”**
- **“Insufficient flowdown of requirements and inadequate validation of these requirements”**
- **“Several significant system and subsystem design and development issues”**
- **“Inadequate independent verification and validation of Mars Climate Orbiter ground software”**
- **“Failure to complete interface control process, as well as verification of specific ground system interfaces”**
- **“Inadequate attention, within the system engineering process, to the transition from development to operations”**

From the Mars Polar Lander Mishap Investigation Board Report

- **“Underfunded by as much as 30%”**
- **”Run by competent but inexperienced engineers”**
- **“Senior managers failed to exercise appropriate oversight”**
- **“Major mistake to design the Polar Lander without critical entry, descent and landing telemetry capability”**
- **“Government and industry teams worked 60-80 hour weeks”**

Future Directions
for
Acquisition Reform

- Decouple R&D from Production
- Web-based, shared data environments
- Focus on Demonstrations (vs. Development)
- Flexible requirements
- Flexible engineering practices